The Effects of Capital Requirements on Good and Bad Risk-Taking

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  - Lower supply of socially-valuable liquidity [not in this paper]
  - **Reduction of socially-valuable risk taking of firms [this paper]**

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  Financial regulation affects the risk-taking capacity of the private sector

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- Implies the usual benefit of tighter capital requirements: reduce excessive risk-taking by banks.

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- We balance this cost of capital requirements against a deadweight loss from bank default, i.e. "bad" risk-taking.

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- Players
  - Firms (run by managers, subject to an agency friction)
  - Banks ($\sim$ technology)
  - Households (own banks and firms, provide labor)
  - Government (provides deposit insurance)

Firms

- Maximize

$$V_t^m\left(x_t^i\right) = \max_{c_t^i, d_t^i, l_t^i} \theta \log c_t^i + \beta^m E_t \left\{ (1-\alpha) V_{t+1}^m\left(x_{t+1}^i\right) + \alpha V^{exit}\left(x_{t+1}^i\right) \right\}$$

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- Project
  - $z_{t+1}^i \in \{0, \bar{z}\}$: idiosyncratic productivity shock
  - w_t: wage (cannot be contingent on z_{t+1}^i)
  - l_t^i: labor

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  - Ensures that managers' first-order conditions hold even as they consume a vanishing fraction of output.

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  - ε_{t+1}: idiosyncratic shocks to banks' productivity
    - $E_t \{\varepsilon_{t+1}\} = 1$.

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$$\begin{aligned} c_t + n_t &\leq a_t + w_t l_t \\ a_{t+1} &= \underbrace{n_t R_{t+1}^E (1-\tau_{t+1})}_{\text{after-tax return on bank equity}} + \underbrace{\pi_{t+1}}_{\text{profits of exiting firms}} \end{aligned}$$

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- Labor supply curve:

$$w_t = \nu_1 (l_t)^{\frac{1}{\nu_2}}$$

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- Deadweight loss:
  - $\lambda > 0$ to capture negative effects of banks' bad risk-taking
  - $\lambda = 0 \Rightarrow$ capital requirements are never optimal.

Equilibrium definition

- Firm managers maximize utility
- Banks maximize profits
- Households maximize utility
- Government budget constraint holds every period
- Labor, deposit, equity, and goods markets clear

Firms' Choices

- Define

$$\Delta^i_{t+1} \equiv \left(z^i_{t+1} - w_t \right) l_t + R^d_t d_t$$

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- If z^i_{t+1} is random, then $w_t < E_t \left\{ z^i_{t+1} \right\}$ and firms are profitable on average.

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- Reason:
  - Depositors at failed banks made whole through deposit insurance.
  - Taxes to pay for deposit insurance exactly offset losses from failed banks.

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  - Lower labor demand leads to reduced output, wealth, and welfare.
- When $\lambda > 0$, increasing capital requirements also reduces the deadweight loss from bank default.

Capital requirements with stochastic z^i_{t+1}

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  - Labor demand $l_t \downarrow \Rightarrow$ Wealth in $t+1$: $X_{t+1} \downarrow$

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- Set A, σ, and ν_1 to match

$$\text{steady-state consumption} = 1$$

$$\text{bank default probability when } \zeta = 10\% = 10\%$$

$$\text{deposit premium } \frac{1}{\beta} - R^d = 2\%$$

other parameters

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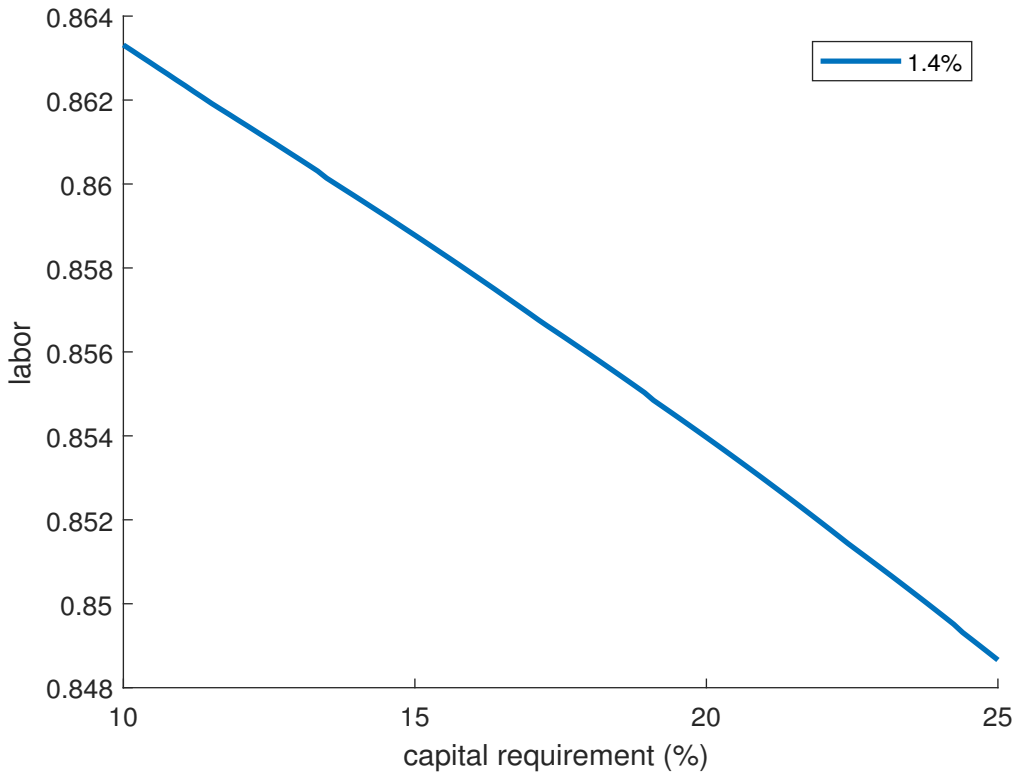

deposit return | default probability

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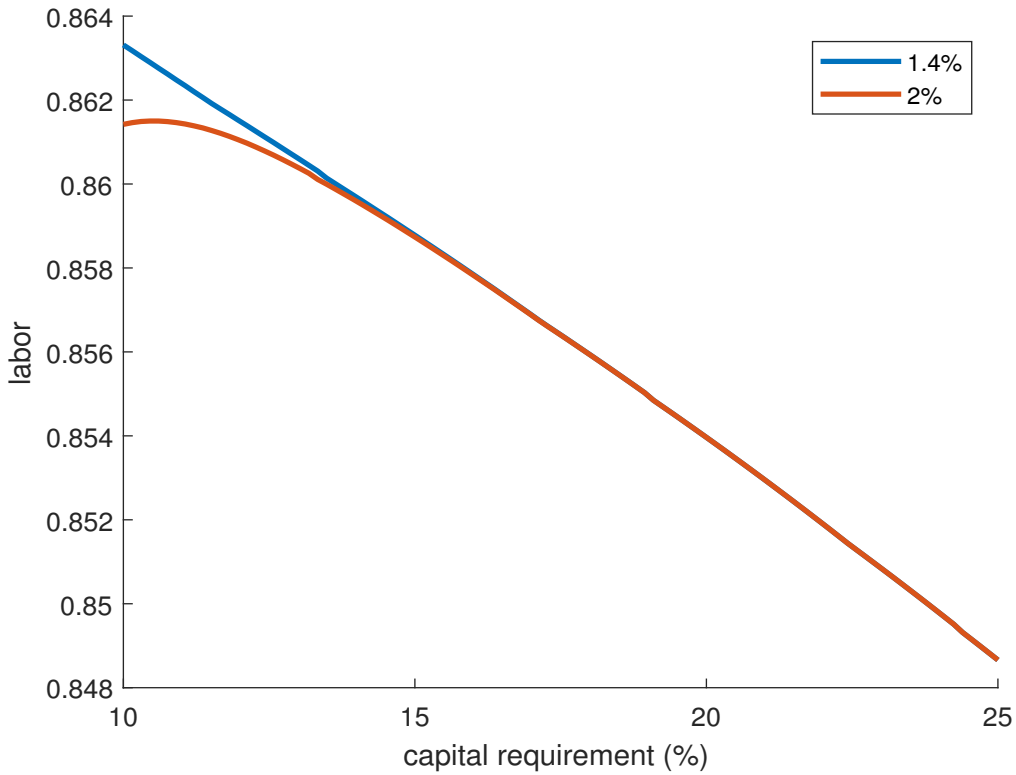

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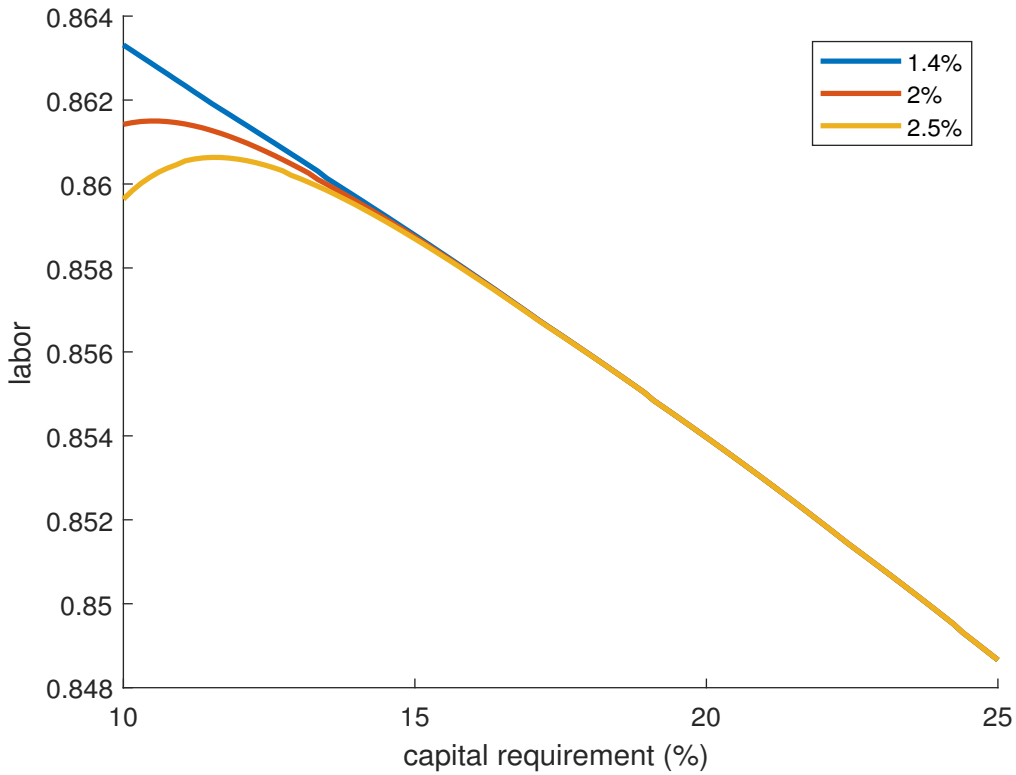

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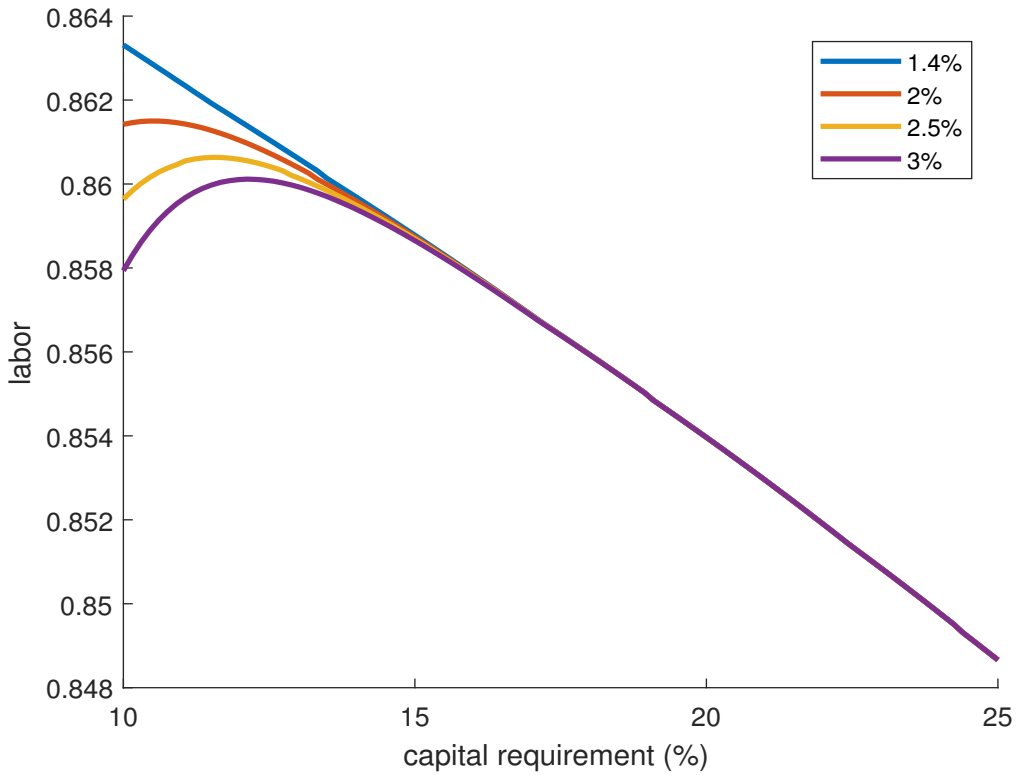

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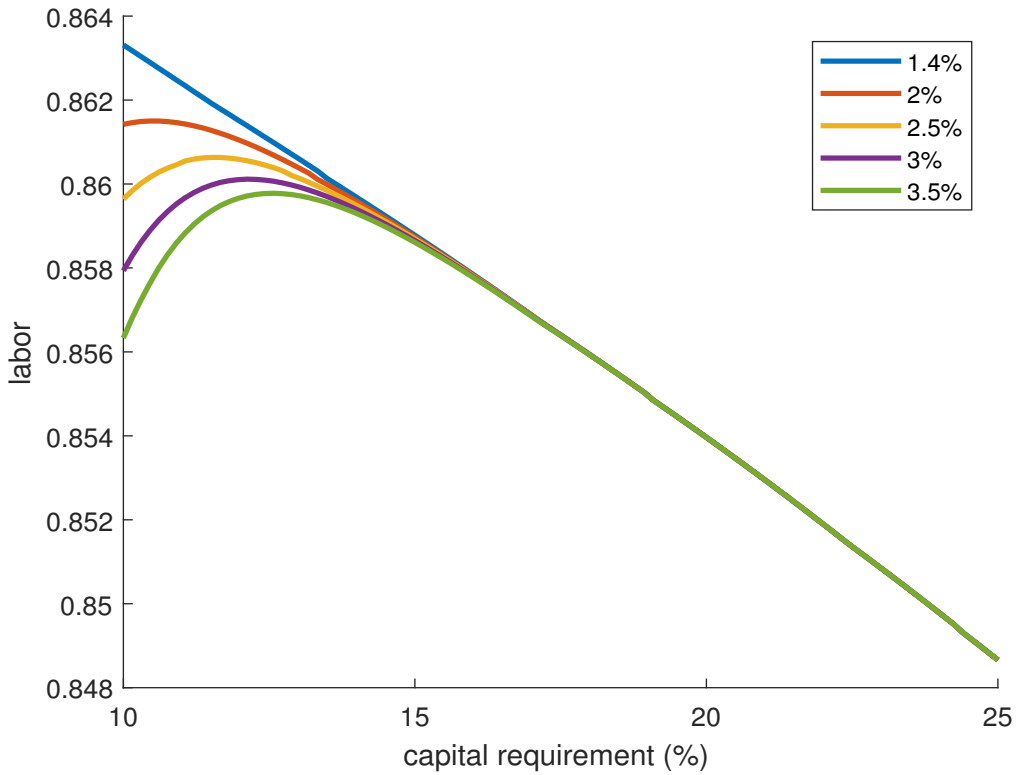

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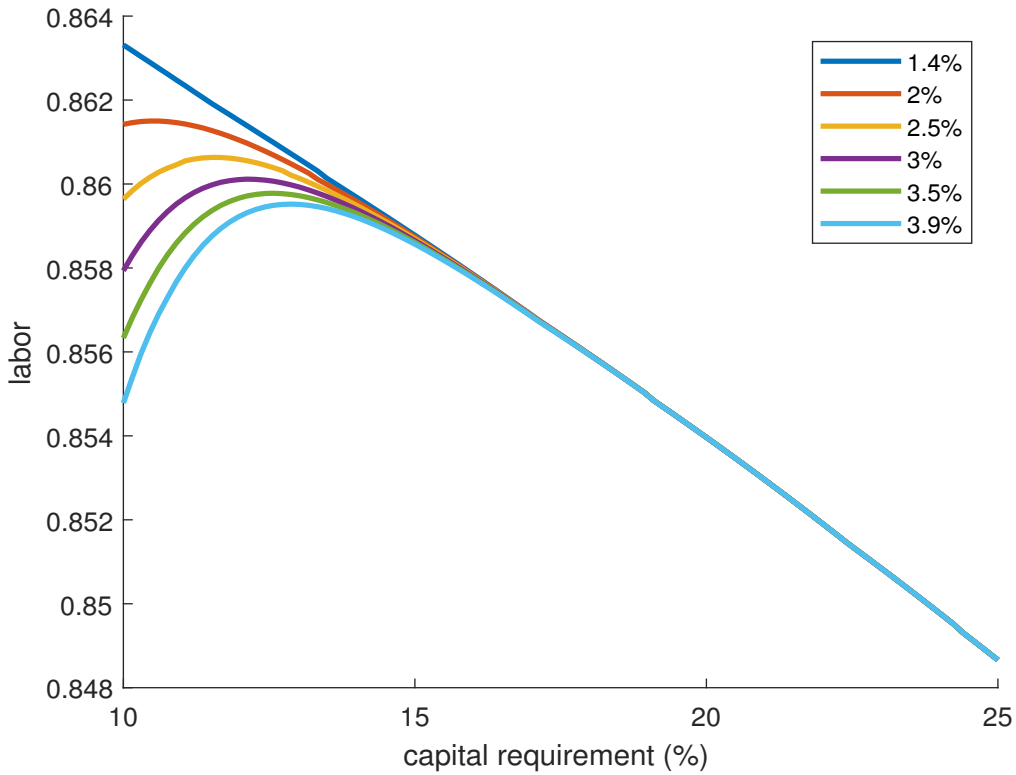
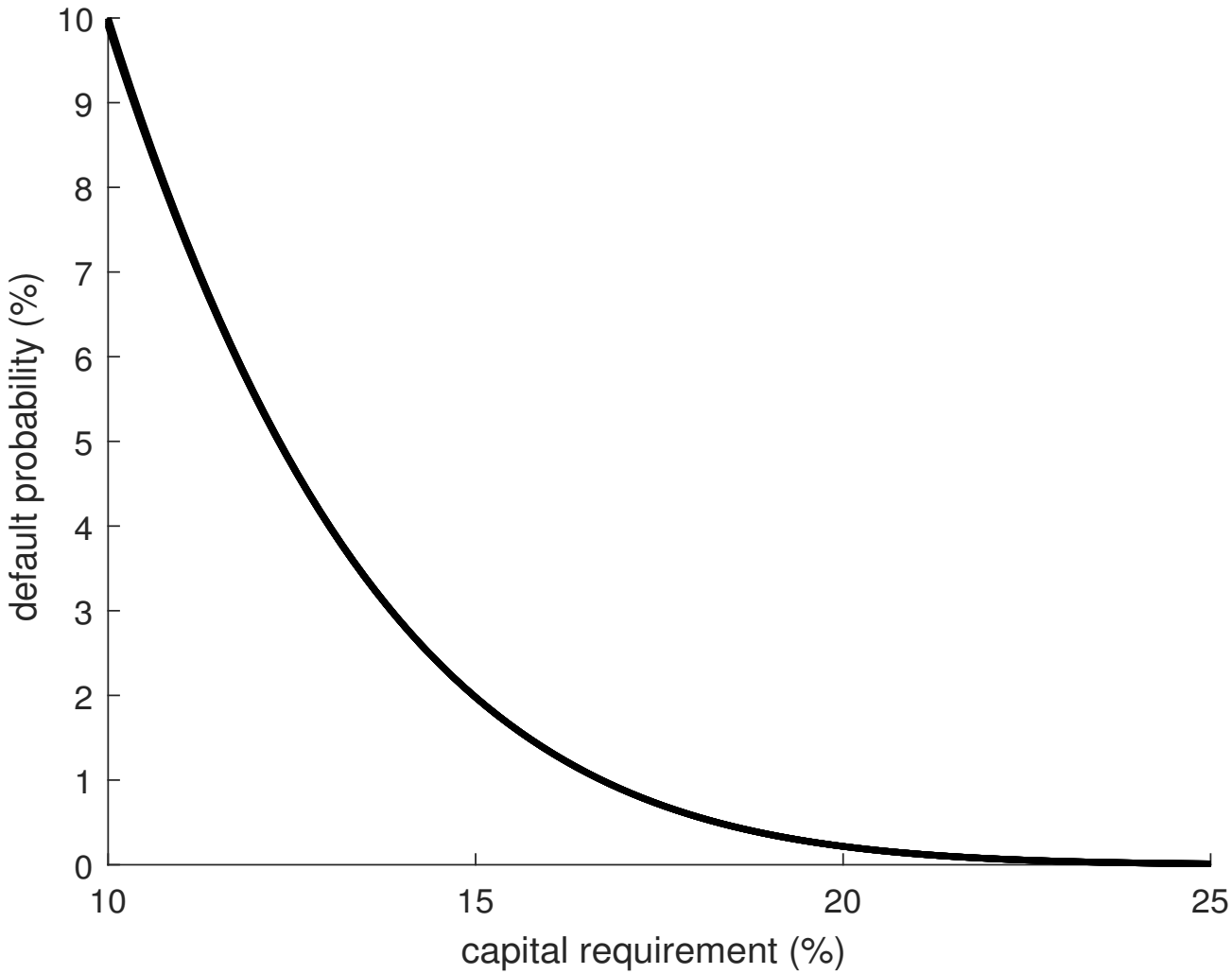


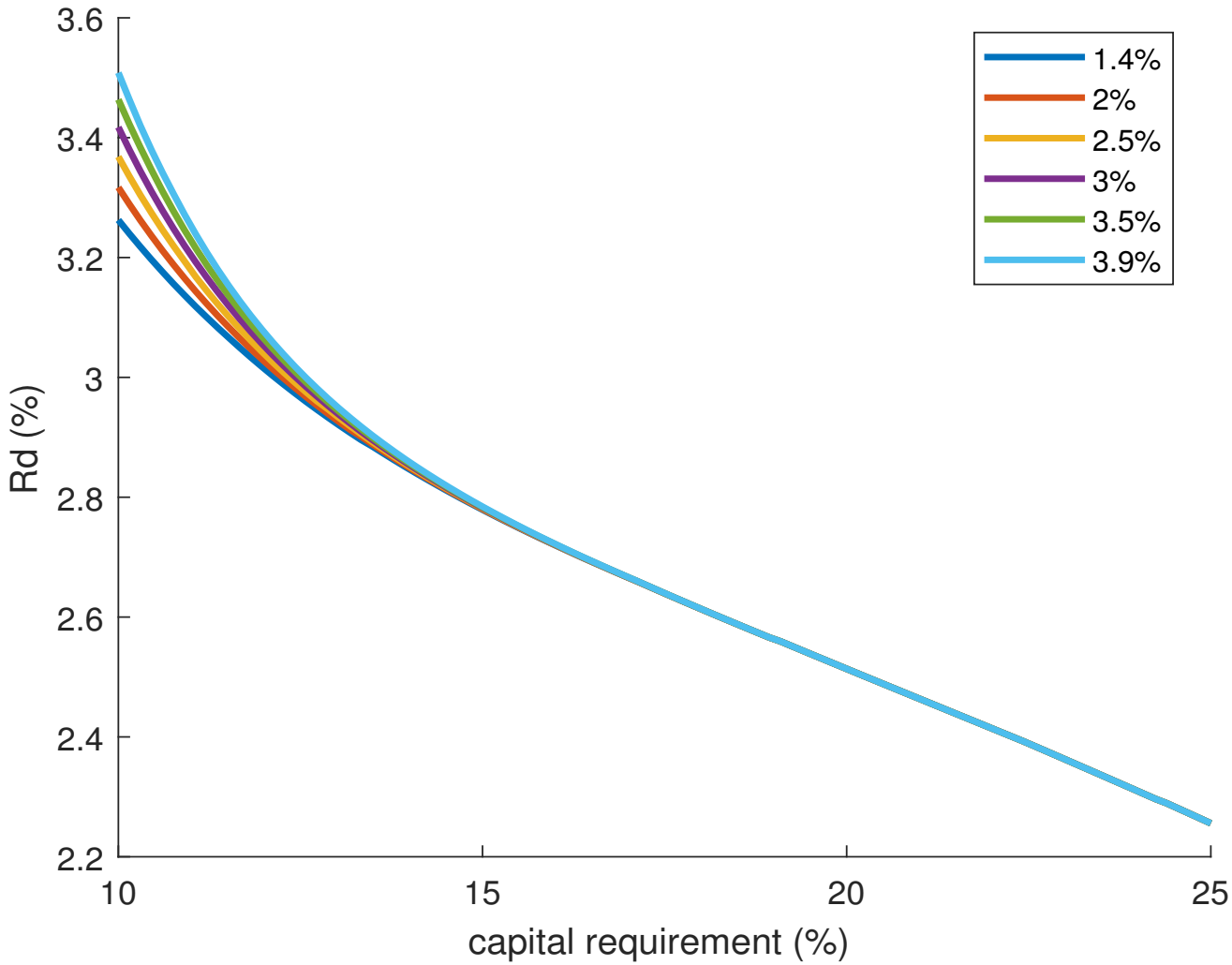
deposit return | default probability

Default Probability



back

Deposit Return



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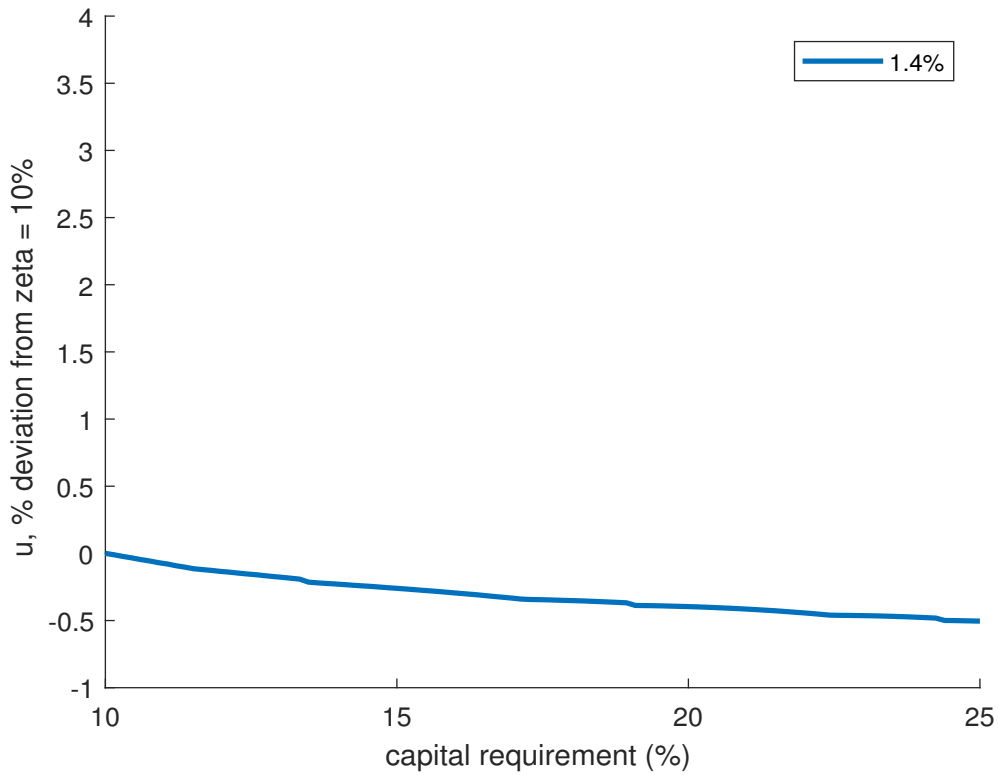

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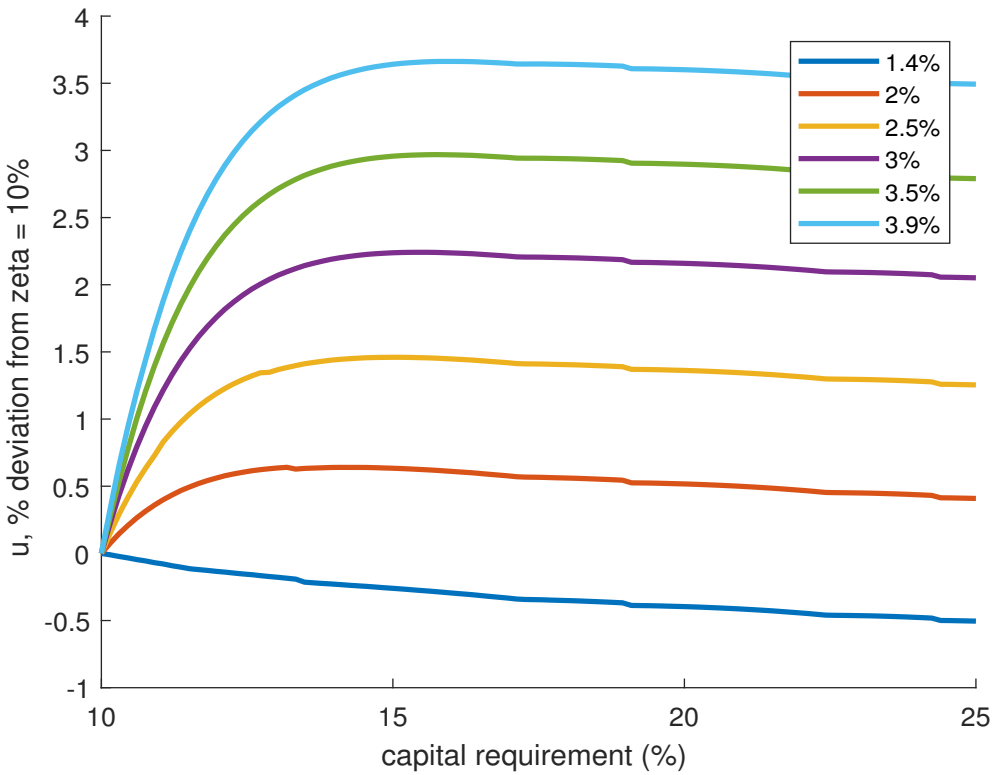
- With $\lambda > 0$, the cost is balanced against a reduced deadweight loss.



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Good Risk-Taking vs. Utility from Deposits

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  - In contrast to theories with deposits in the utility function

Conclusion

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- Only $\sim 50\%$ of deposits in the U.S. are insured.
  - Adds another channel: capital requirements *do* make agents' portfolios safer, in addition to the deposit insurance subsidy.

Numerical example: parameter values

Set Parameters	
Parameters	Value
β	0.95
ν_2	1
p_z	0.70
$\bar{k}$	1

Calibrated Parameters			
Parameters	Value	Target	Target Value
A	0.135	Steady-State c	1
σ	0.079	Banks Default Probability	10%
ν_1	1.038	Deposit Premium $\frac{1}{\beta} - R^d$	2%

back

Government: tax rate

- Tax rate on wealth of entrepreneurs τ_{t+1}:

$$\tau_{t+1} = \frac{T_{t+1}}{\int \left[\left(z^i_{t+1} - w_t \right) l^i_t + R^d_t d^i_t + R^E_{t+1} n^i_t \right] di}$$

back

Basel III Capital Requirements

Aggregate capital ratios and (incremental) capital shortfalls

Table 2

	Fully implemented requirement, in per cent		Basel III capital ratios, in per cent		Risk-based capital shortfalls, in billions of euros[1]		Combined risk-based capital and leverage ratio shortfalls, in billions of euros[1]	
	Min	Target[2]	Transitional	Fully phased-in[3]	Min	Target[2]	Min	Target[2]
Group 1 banks								
CET1 capital	4.5	7.0–9.5	12.2	11.9	0.0	0.0	0.0	0.0
Tier 1 capital[4]	6.0	8.5–11.0	13.4	12.9	0.0	1.4	0.0	1.4
Total capital[5]	8.0	10.5–13.0	15.8	14.6	0.0	3.4	0.0	3.4
Sum					0.0	4.8	0.0	4.8
Of which: G-SIBs								
CET1 capital	4.5	8.0–9.5	12.1	11.8	0.0	0.0	0.0	0.0
Tier 1 capital[4]	6.0	9.5–11.0	13.4	12.9	0.0	0.0	0.0	0.0
Total capital[5]	8.0	11.5–13.0	15.8	14.7	0.0	0.9	0.0	0.9
Sum					0.0	0.9	0.0	0.9
Group 2 banks								
CET1 capital	4.5	7.0	13.8	13.4	0.0	0.0	0.0	0.0
Tier 1 capital[4]	6.0	8.5	14.2	13.8	0.0	1.0	2.9	3.9
Total capital[5]	8.0	10.5	16.4	15.4	0.0	4.0	0.0	4.0
Sum					0.0	5.0	2.9	7.9

back

Basel III Capital Ratios

Fully phased-in Basel III CET1, Tier 1 and total capital ratios

In per cent — Table A.3

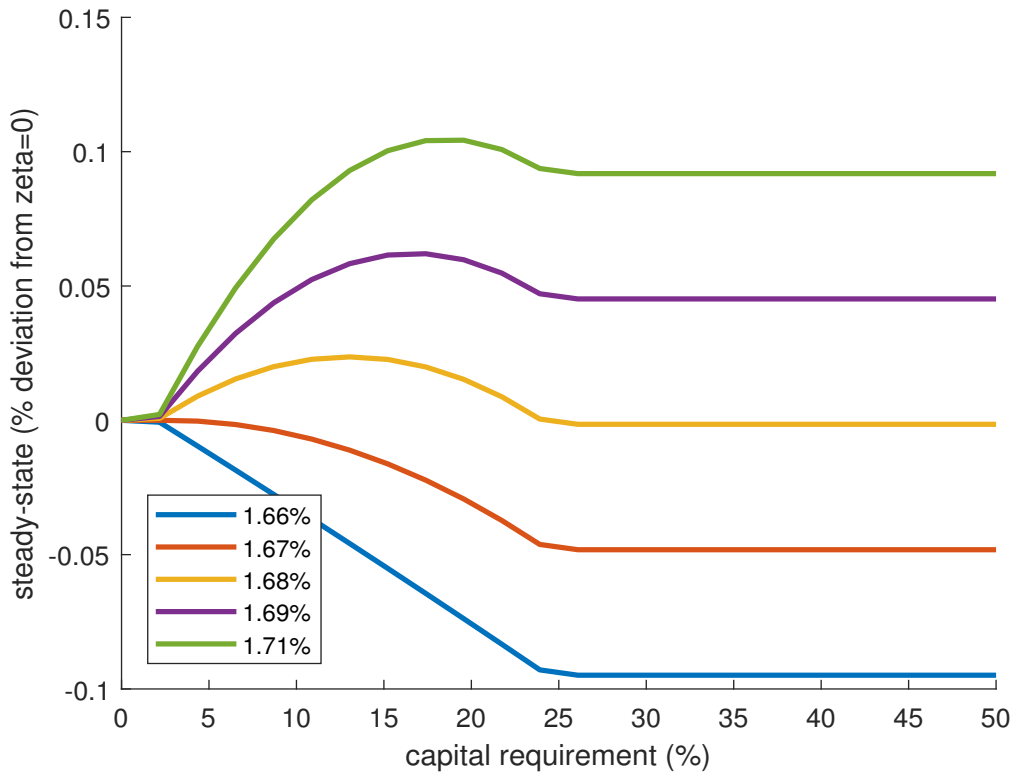
	Group 1 banks			Of which: G-SIBs			Group 2 banks		
	CET1	Tier 1	Total	CET1	Tier 1	Total	CET1	Tier 1	Total
Max	23.8	26.0	29.3	16.8	18.4	22.3	49.2	57.0	57.0
75th percentile	13.8	14.3	16.8	13.0	14.1	17.1	18.3	18.3	19.7
Median	12.1	13.0	14.5	11.8	13.1	15.0	13.9	14.1	15.6
25th percentile	10.9	11.6	13.1	10.9	12.0	13.5	11.4	11.9	13.0
Min	8.1	8.1	9.6	9.4	10.7	10.9	6.9	6.9	8.2
Weighted average	11.9	12.9	14.6	11.8	12.9	14.7	13.4	13.8	15.4

Source: Basel Committee on Banking Supervision.

back

Results (Increase DRS parameter α)

- Increase α until unconstrained capital ratio $y = 2\%$.
- Match 1.7% crisis tax at $\gamma = 0.76$.



back

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- Increase ν_1 until deposit premium $\frac{1}{\beta} - R^d = 50$ bps.
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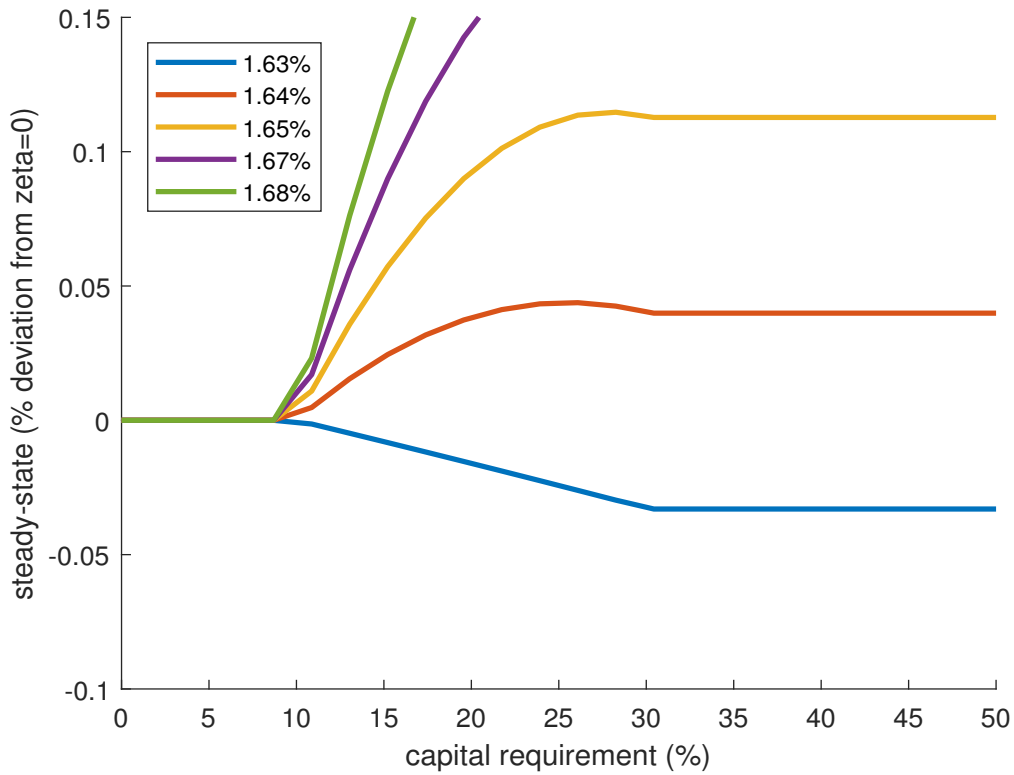

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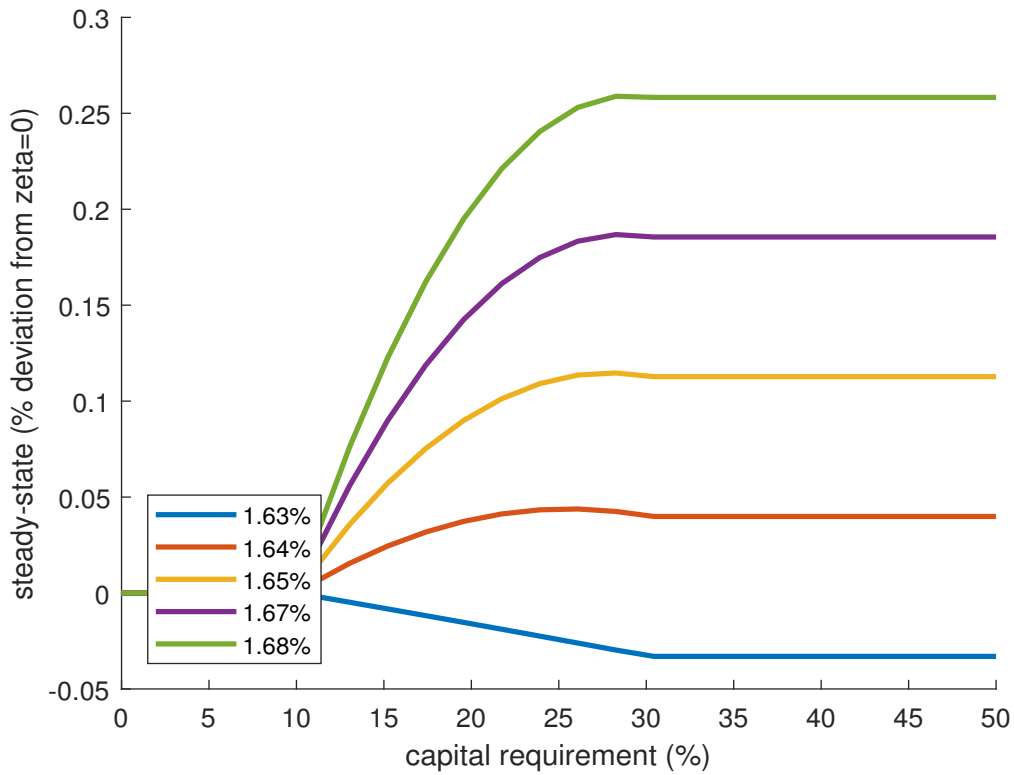

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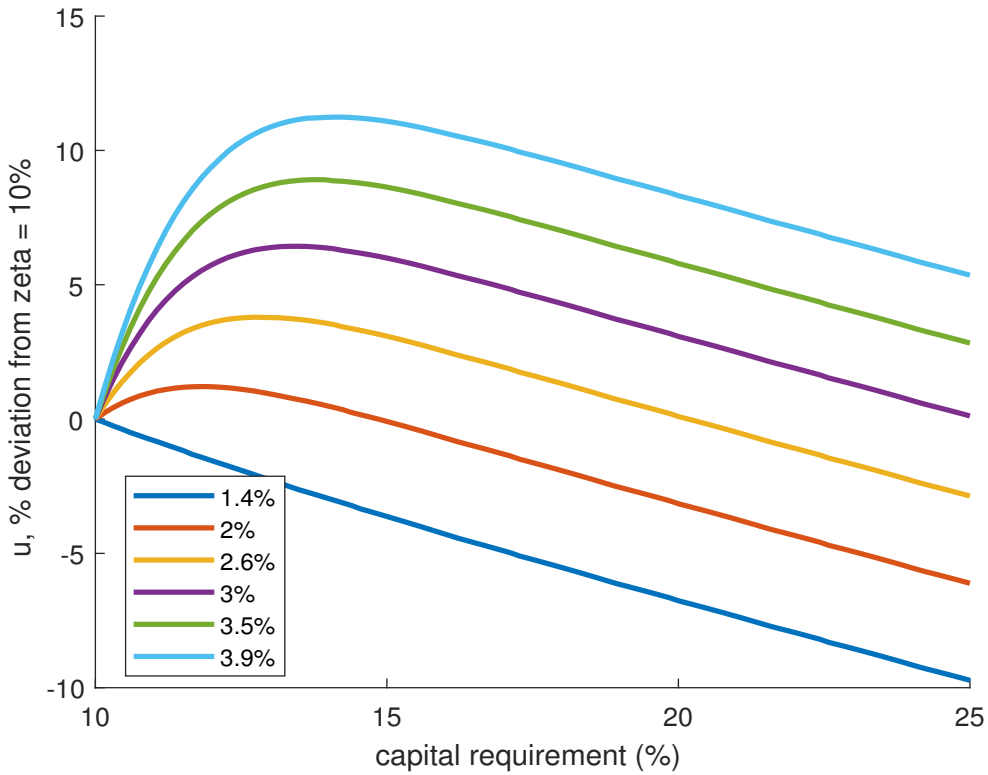
Numerical example (big shocks): parameter values

- $\nu_1 = 0.6612$
- $A = 1.032$
- $\nu_2 = 100$
- $\beta = 0.95$
- $p_c = 1\%$
- $s = 8.9\%$
- $\gamma = 0.66$
- $\alpha = 0.99989$
- $z^i_{t+1} \in \{0,\ A\},\ Pr\left(z^i_{t+1} = A\right) = 0.7$

back

Welfare with $\nu_2 = 100$

- With $\lambda = 0$, there is no benefit to capital requirements, only a cost.
- With $\lambda > 0$, the cost is balanced against a reduced deadweight loss.



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